

Observation and Inference

Teacher's Guide

Subject: Integrated Science (Life; Earth-Space; Physical)

Topic: Nature of Science, methods of science

Summary: Students will make observations of natural phenomena and draw conclusions from these observations.

After completing the field lab, students will be able to:

- Objective(s):**
1. Determine the difference between an observation and an inference.
 2. State the definitions of qualitative and quantitative observations.
 3. Demonstrate the ability to record an observation.

Ecosystem(s): Any

Equipment:

- 2 magnifying glasses
- 2 rulers
- 10 objects to observe
- 30 meter tape measure
- clipboards/data sheets

Background:

- Vocabulary: observation, inference, quantitative, qualitative, cause, effect
- Reference Material: *What is Science?* Life Science. Glencoe. Chapter 1.
Nature of Science <http://evolution.berkeley.edu/evosite/nature/index.shtml>

Procedure (Engage; Explore; Explain)

1. Prior to walking down the nature trail, engage the students by asking a specific question that gets to the heart of the activity: Start by asking the students to describe a specific object. See what they know about the difference of observations and inferences. Use the students' answers to ascertain what they already know, clarify any misconceptions.
2. Ask the students to formulate their own hypothesis relating to their own expectations of the outcome of the lab. Which of your senses do you think you would use the most when making observations?
3. Students will walk down the nature trail and stop at up to 10 predetermined objects.

Examples below:

- | | |
|--------------------------------------|----|
| a. Plants with holes | a. |
| b. Plant with eaten leaves | b. |
| c. Palms that have burnt bark | c. |
| d. Palm stump | d. |
| e. A noise. Cicada, cricket, or bird | e. |
| f. Gopher tortoise hole | f. |
| g. Ant lion holes | g. |
| h. Doodle trails | h. |
| i. Animal prints | i. |
| j. Trash | j. |
| k. Drip holes from deck | k. |

Procedure Cont'd

4. At each stop the students will fill out the data sheet. They will write down a qualitative description of the object, circle the sense they used to describe the object, write a quantitative description, counting or measuring something on the object, then write an inference.
5. Discuss the objects with the group and get input from the students. The students will have several different descriptions amongst the group.
6. After completing the lab, allow the students to answer the discussion questions as a group and explain their answers relating them to the concepts, processes and skills associated with the activity. Students should record their answers individually. At this time, facilitators can introduce/explain the specific concepts and explanations in a formal manner.

Sunshine State Standards:

Science: SC.G.2.3; SC.H.1.3.1,4, 7;

Language Arts: LA.A.1.3.3; LA.B.2.3.1;

Mathematics: MA.A.3.3.3; MA.B.2.3.1; MA.B.4.3; MA.C.1.3.1; MA.E.3.3.1;

Social Studies: SS.A.2.3.7; SS.A.3.3.3; SS.B.2.3.9

Observation and Inference**Student Data Sheet****General Information**

| | | | |
|------------------|--|-------|--|
| Full Name: | | Date: | |
| Science teacher: | | Time: | |

Student Hypothesis and Rationale

If I use my five senses when making observations, then I believe that I will use my sense of

_____ the most when making observations, because _____

Field Observations/Measurements/Data

| | | | | | | |
|-----------------|--------------------------|-------|-------|-------|-------|---------|
| Object 1 | Qualitative Observation | | | | | |
| | Which sense did you use? | Sight | Smell | Taste | Touch | Hearing |
| | Quantitative Observation | | | | | |
| | Inference | | | | | |
| Object 2 | Qualitative Observation | | | | | |
| | Which sense did you use? | Sight | Smell | Taste | Touch | Hearing |
| | Quantitative Observation | | | | | |
| | Inference | | | | | |
| Object 3 | Qualitative Observation | | | | | |
| | Which sense did you use? | Sight | Smell | Taste | Touch | Hearing |
| | Quantitative Observation | | | | | |
| | Inference | | | | | |
| Object 4 | Qualitative Observation | | | | | |
| | Which sense did you use? | Sight | Smell | Taste | Touch | Hearing |
| | Quantitative Observation | | | | | |
| | Inference | | | | | |

| | | | | | | |
|------------------|--------------------------|-------|-------|-------|-------|---------|
| Object 5 | Qualitative Observation | | | | | |
| | Which sense did you use? | Sight | Smell | Taste | Touch | Hearing |
| | Quantitative Observation | | | | | |
| | Inference | | | | | |
| Object 6 | Qualitative Observation | | | | | |
| | Which sense did you use? | Sight | Smell | Taste | Touch | Hearing |
| | Quantitative Observation | | | | | |
| | Inference | | | | | |
| Object 7 | Qualitative Observation | | | | | |
| | Which sense did you use? | Sight | Smell | Taste | Touch | Hearing |
| | Quantitative Observation | | | | | |
| | Inference | | | | | |
| Object 8 | Qualitative Observation | | | | | |
| | Which sense did you use? | Sight | Smell | Taste | Touch | Hearing |
| | Quantitative Observation | | | | | |
| | Inference | | | | | |
| Object 9 | Qualitative Observation | | | | | |
| | Which sense did you use? | Sight | Smell | Taste | Touch | Hearing |
| | Quantitative Observation | | | | | |
| | Inference | | | | | |
| Object 10 | Qualitative Observation | | | | | |
| | Which sense did you use? | Sight | Smell | Taste | Touch | Hearing |
| | Quantitative Observation | | | | | |
| | Inference | | | | | |

Observation and Inference

Assessment

1. List each sense and the number of times you used each one. Which one of your senses did you use the most? Which one did you use the least?

2. Look at your observations for Object #3. Was it easier to make a qualitative or quantitative observation about this object? Which observation gives you the most information about the object?

3. Look at your answer to question one. Was your hypothesis supported or not? What can you infer from the number of times you used each sense?

4. If you were in a cave with no light, how would you use your senses differently? What types of things would you be able to observe?

5. Why is it important to understand the difference between observation and inference?
